AFRICAN NATIONS AND ACCESS TO TELECOMMUNICATIONS SERVICES: POLITICAL ECONOMY AND LEGAL ISSUES

by

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Despite the United Nations General Assembly's resolution declaring the period 1978-1987 the "Transport and Communications Decade in Africa" the performances of African telecommunications networks remain among the poorest, if not the poorest, in the world.

The 1980 Yearbook of Common Carrier Telecommunications Statistics published by the International Telecommunications Union (ITU) indicated that, as of January 1979, on a world total of 279,528,000 telephone main lines (ML) Africa had only 0.9 percent (2,515,725) of this total, the North American continent having 39.1 percent (109,297,000). Africa has also the lowest telephone density (0.66 per 100 inhabitants in North America, and 14.6 ML in Europe. But general statistics vary from one source to another. The ITU suggests 0.4 telephones per 100 inhabitants in Africa, (1) thus, contradicting data (0.6 per 100 inhabitants) published by the above mentioned yearbook. Further, key determinants like "rural areas" and "urban areas" are not defined at all, which does not help policy-makers to have a fair judgment on the magnitude of the imbalances between cities and villages regarding the rate of telephone fluctuation in Africa.

Statistics are even more negative for about one quarter of African countries which have a telephone density equal to or below 0.1 percent per 100 persons (2). The ITU study on **Appropriate Modern Telecommunications Technology for Integrated Rural Development in Africa** suggested the following statistics for 8 Black African countries: the number of direct exchange lines (DEL) per 100 inhabitants was as low as 0.06 in Chad, Mali, and Rwanda. The number of DEL in Nigeria and Burkina Faso stagnated (0.07) while in Zaire, Niger and the Central African Republic (0.10), Guinea-Bissau (0.13) and Benin (0.17) statistics were very alarming. According to the same source a comparative exercise on telephone penetration in the urban and rural areas of 26 sub-Saharan African countries indicated that on a total population of around 266 million people including an overwhelming majority of rural population (more than 219 million people) there was a global number of around 1 million telephone sets. On this grand total, rural areas have only approximately 139,000 telephone sets which corresponded to a level inferior to 14 percent. But in several countries this average ratio was much lower: 1 percent in Ivory Coast, 2.5 percent in Senegal, 3 percent in Upper Volta, 6 percent in Congo and Ethiopia, 7 percent in Z#mbia and 8 percent in Tanzania. Measured in terms of telephone density per 100 rural population for the 1978-1980 period the statistics were much more unfavorable: Zambia 0.006, Angola 0.08, Burundi 0.04, Cameroon 0.07, Ethiopia 0.02, Ivory Coast 0.14, Mali 0.017, Nigeria 0.02, Senegal 0.03, Sudan and Tanzania 0.04. However, it should be noted that an important factor is ignored by these statistics. They do not take into account the concentration of telephone networks in and around the major cities in rural areas (3).

From 1969 to 1979, the African stock of equipments grew only by 1,082,500 ML (0.8 percent) and 2,024,800 stations of all kinds (SAK) (1 percent). During the same period the stock of equipment in North America grew by 20.5 percent (27,109,000 ML). In 1977, an ITU survey indicated that more than half of fifty African countries had less than 20,000 telephones and that only eight among those countries had a total number of telephones exceeding 100,000 (with the exception of Namibia and South Africa). As a result, penetration of telephones in twelve Black African countries is lower or equal to 0.1%. Key countries --in terms of their economic potential, national resources, and demographic weight-- like Zaire, Nigeria, and Mozambique, belong to this group (4).

The recently published UNESCO Report on World Communication definitely places African statistics as the lowest in the world (5).

1. In Search for an Integrated Telecommunications Network on a Pan-African Scale

It was in an uncertain context that twenty-six African states represented by 115 delegates and six overseas observers met in Dakar, Senegal, in 1962 under the auspices of the International Telecommunications Union. An African Plan Subcommittee created two years earlier by the Plenary Assembly of the International Telegraph and Telephone Consultative Committee (CCITT) and the International Radio Consultative Committee (CCIR) outlined, with the participation of the African Postal and Telecommunications Administrations, the first international plan for the development of an African telecommunications network (6).

The plan established in Dakar was an ambitious one. It included the establishment of direct links between the African countries without passing through centres outside Africa, and the gradual replacement of numerous high frequency radio links by overhead wire carrier links, underground or submarine cables and radio-relay links.

The delegates also reviewed the technical, operational and tariff problems of interest to the countries in the region and adopted resolutions on the technical assistance desired by African countries.

In 1967, a second meeting of the African Sub-Committee, subsequently called African Plan Committee, was organized in Addis Ababa, Ethiopia. In June 1968, two consultant teams began a preliminary study covering 38 African countries representing 87 percent of the population and 85 percent of the area. Completed in October 1969, the study forecast traffic growth through 1990, selected reliable trunk routes (7), and reviewed the state of numbering and transmission plans, the signalling systems in use or planned (8), routing plans and existing tariff structures.

1969 was a pivotal year for Africa in her effort to initiate progress in telecommunications planning. Indeed, major credits totalling 2,057,500 U.S. dollars were granted by the UNDP at the request of the ITU and 30 African countries for detailed technical, economic and financial studies of the transmission arteries (20,000 kilometers) and 18 international switching centers to be installed. The pre-investment study following the ITU pre-feasibility study completed in October 1969, included all possible

transmission media (metallic line arteries, coaxial cables, submarine cables, radio relay systems and a regional satellite system). The agenda also included the selection of a single common regional signalling system, the adoption of tariffs and methods for forecasting benefits on a regional level, and the establishment of very close working relationships between African administrations in national and international telecommunications matters. UNDP agreed that the ITU should hire experts supervised by a Project Manager and benefitting from the technical and administrative services of the International Consultative Committee and the Group of Engineers set up by the Plenipotentiary Conference (Montreux, Switzerland, 1965) within the UNDP's Technical Cooperation Department (9).

The survey carried out by Norconsult of Oslo (Norway), Preece, Cordew and Rider Brighton (United Kingdom), Acres Intertel of Toronto (Canada), Sofrecom of Paris (France), and Swedtel of Stockholm(Sweden), concluded that a Pan African telecommunications network (Panaftel) combining coaxial cables and radio-relay links is the best system to meet African telecommunications needs. It was agreed that Panaftel should not only ensure interconnection between African countries but also serve important national centers.

Conscious of the importance of these conclusions for the implementation of the Panaftel project, the OAU approved them and adopted a resolution stressing the pressing need to accelerate the creation of an integrated Pan African telecommunication network. A Coordinating Committee was immediately set up to organize more effectively than in the past the investments coming from external sources and desperately needed by the African states. The Committee was headed by the Administrative Secretary-General of the OAU, the Executive Secretary of the ECA, the President of the African Development Bank (ADB), and the Secretary-General of the ITU. The ITU handled the coordination of the technical aspects of the Panaftel project while ADB was responsible for the financial aspects.

During these difficult years, and in the absence of a strong Pan-African telecommunications authority, the ITU assumed responsibilities which undoubtedly had an impact beyond the level initially desired by the newly created African states. Furthermore, as the African governments controlled the postal and telecommunications facilities under severe budgetary and administrative constraints, the scope of their action was limited not only nationally but on a panafrican and an international level as well. The postal and telecommunications administrations shared a common organization generally known as Postal, Telephone and Telegraph office (PTT). An ITU study pointed out that "as a result, a host of undesirable features brought about by common organization has stifled the development and growth of 300 telecommunications industry as compared to other public utilities such as transport, water or electricity which are self-contained and operated as an independent organization". The report also underlined the fact that "a large scale management planning and development of telecommunication administration and organization" was urgently needed in order to increase performances at the operational level.

In the early 1970s, another specialized agency of the United Nations, the United Nations Education, Scientific and Cultural Organization (UNESCO) was also involved in the efforts aiming at increasing telecommunications growth in the African continent. In October 1973, an African Regional Seminar on Satellite Broadcasting Systems for Education and Development was held in Addis Ababa, under the auspices of the UNESCO. Participants at the seminar suggested that further studies be undertaken in view of establishing an integrated satellite system which could be used for education, information, training and public telecommunications.

The Anglo-French satellite Symphonie was launched and used for demonstrations in several African nations, in particular, in Cameroon and Ivory Coast. While Cameroon withdrew very early from the project the Ivory Coast was chosen as the main target country in an attempt to "sell" the performances and reliability of a European satellite system financially backed by the European Economic Community. This European initiative was perceived by the Americans as a hostile move against their own interests and, in any case, as a threat to the U.S. dominated International Telecommunications Satellite Organization (Intelsat). The same year, the U.S. Agency for International Development, in conjunction with the National Aeronautics and Space Administration (NASA), spent 3 million US dollars to promote the ATS-6 satellite system in several African countries.

In the AESOP-6 project, manufacturers from 13 European countries who manage Eurospace planned to replace the Symphonie satellite by a more powerful OTS satellite operating in the 11/14 GHz band and capable of retransmitting from two to twelve television programs. Eurospace claimed that the project was specially designed for developing countries, and Africa, in particular, despite evidence to the contrary. Indeed, the project would require a sophisticated terrestrial network equipped with 8 meter transmit/receive antennas and 4 meter receive only antennas.

In 1977, the launching of OTS failed miserably. A European expert, Jacques Dessaucy, reported that the project was sabotaged by the U.S.A. since it was competing with similar American projects (10).

The African response to this growing competition on the international telecommunications market was, at best, ambiguous. Actually, the African governments were divided by a deep political and ideological crisis. Furthermore, they did not have the opportunity nor perhaps the political wisdom to carefully evaluate the situation of their respective telecommunications sectors and translate into facts without any further delay the goal for unifying their telecommunications policies. A previous unified attempt to cope with telecommunications problems was present through the creation by 14 African countries mostly "francophone", of the Union Africaine et Malgache des Postes et Telecommunications (African and Malagasy Union of Posts and Telecommunications) in September 1961 (Antananarivo, Madagascar). After its reconstruction in 1975 and Madagascar's withdrawal, along with two other countries, the Union presently called Union Africaine des Postes et Telecommunications (African Union of Posts and Telecommunications) focused on fostering cooperation between member countries in technical and policy matters and between ITU and the Union (11).

The omnipresence of West European and North American consulting firms or multinational organizations will be confirmed later on (12) while the OAU, PATU, URTNA and the UAPT failed to autonomously conduct a coherent telecommunications strategy assessing the present and future needs of the continent, and taking the proper steps to overcome the existing impediments.

Stiff competition opposed the ITU and Intelsat. The strategy of the latter was to accelerate the construction of ground stations in thirty-six countries in Sub-Saharan Africa as of January 1981 while the former favored the extension to a maximum level of the terrestrial networks and the creation of a regional satellite system for Africa. However, Intelsat's "lowest cost approach to rural communications for Third World countries" was designed in such a manner that it met the preoccupations of the African countries for the deployment of hybrid telecommunications systems (combining terrestrial and spatial routes). From 1976 to 1981, five African countries (Nigeria, Sudan, Uganda, Zaire, and Niger) leased transponder facilities for their domestic needs. The West European countries (mainly France, West Germany, and the United Kingdom) despite their decreasing financial capabilities and the decisive impact of the U.S. multinational firms on their respective economies and telecommunications systems, decided to accept Intelsat's challenge, at least on the surface, and in the hope of protecting their African preserves.

The opportunity to evaluate the satellite telecommunications needs and projects of the UAPT member countries was again offered during the Satellite Telecommunications Colloquium held in Abidjan, Ivory Coast (21-24 November 1978) under the sponsorship of the French Ministry of Technical Cooperation, the French Administration of Posts and Telecommunication, the Franco-German Group Symphony and the Centre National d'Etudes Spatiales (the French NASA created in 1962 by the late General de Gaulle, a partisan of French autonomy in spatial matters). During this colloquium, the French participants voiced their concern about Intelsat's monopoly in intercontinental telecommunications by satellite and highlighted the benefits that could be derived by the African states from a regional satellite system under European leadership.

After the creation of the Panaftel network it became necessary to coordinate on a continental level the telecommunications investments undertaken by each member country. At the 31st Session of the OAU Council of Ministers held in Khartoum (July 1978) a Resolution (CM/Res. 654 XXXI) was adopted calling for the inclusion of PATU in the Panaftel Coordination Committee (13). The year 1979, preceded by the proclamation on 9 March 1978 of the United Nations Transportation and Communications Decade in Africa (UNTACDA) for the period 1978-1988, was a round of tense negotiations and tough decisions for the African countries.

In March, the European Space Agency demonstrated the operation of OTS-2 at the Fifth Ministrerial Conference of ECA member countries held in Rabat. A 3 meter mobile antenna received French television programs as well as ESA films (14).

In May, the feasibility of a Regional Telecommunications Network by satellite for Africa was on the agenda of the Conference of African Ministers of Transports, Communications and Planning jointly sponsored by the UN-ECA and the OAU in Addis Ababa. The project was immediately ratified by UNTACDA with PATU and ECA as co-initiators (15) and will be known as AFROSAT.

At the same time, a meeting held in Kigali, Rwanda, under the auspices of the UAPT, decided to commission the feasibility of a regional satellite system for its members and eventually other African countries interested in the project then called AFSAT. The financial support of the European Development Fund was announced during the meeting (16). Meanwhile, Panaftel which was designed to link the OAU member States began a pre-feasibility study financed by the ITU and the German Society for Technical Cooperation. This study was commissioned at the time when the Panaftel Coordinating Committee meeting in Geneva encouraged an agreement between the ITU and the Economic Community of West African States (ECOWAS). The ITU was commissioned to carry out several studies and surveys of microwave links, a satellite earth station and a few telephone switching centers in West Africa (17).

All these studies, and, more particularly, the AFROSAT and AFSAT projects were undertaken at a time when international relations were strained by the dominated nations call for a new world information order and a new international economic order. An unprecedented offensive was launched by the united front of the non-aligned countries during the UNESCO meetings. At the United Nations the same tense atmosphere prevailed. This episode of the international class struggle which stake was and still remains a balanced share of the communications resources and technology worldwide was a rewarding effort for many dominated countries willing to take a political advantage of the situation. Whichever tactical considerations were then on Africa's political agenda, the compromising stand of most African countries and the lack of coordination of their positions in the international fora was an outstanding fact. Black Africa's surprising silence at the 1979 WARC should be traced to a regrettable error of judgment concerning the future implications for a region which lacks a resource as vital as the frequency spectrum.

Routine meetings multiplied in Africa during the year 1980 with the exception of two gatherings: the UNESCO's Intergovernmental Conference on Communications Policies in Africa (AFRICOM) held in Yaounde, Cameroon in July 22-31, 1980, and the Second Special Session of the Conference of Chiefs of State and Government (CCSG) held in Lagos (April 1980). The UNESCO's Conference, attended by twenty-eight Black African countries (out of 54 African states) adopted the Yaounde Declaration calling for more justice in the world economic and communication orders as well as for collective self-reliance, modernization and democratization of African communications policies. The declaration was worded in such a manner that everyone --"radical" as well as "moderate" countries-- would be satisfied. Recommendations 18 and 19 of the Declaration placed the ITU and the United Nations agencies in a leading position concerning the implementation of satellite communications projects in Africa. As to the Lagos Plan of Action established by the CCSG, it emphasized the necessity to "establish a

regional satellite communications system as a complement to the Panaftel system" (Chapter IV, paragraph 238) (18).

In 1981, a Regional Seminar on Remote Sensing Applications and Satellite Communications for Education and Development was held in March 1981 at ECA headquarters in Addis Ababa.

What all this meant was that strategies aiming at increasing levels of technology transfer in the area of satellite remote sensing from a few organizations and countries (Landsat and programs developed by the USA, USSR, India, the European Space Agency, Japan, etc.) to a large number of dominated countries were aggressively promoted and placed on the international agenda at a time when the dominated countries had not yet fully evaluated the benefits and the dangers linked with the use of remote sensing technology. In Africa, U.S.-AID promoted the Landsat program throughout the continent, particularly in Kenya while the France-managed SPOT system (Systeme Probatoire d'Observation de la Terre) which was scheduled to be operational in 1984 was actively tested in Burkina Faso. The success met by the Americans and the French in launching their remote sensing programs was partly due to the favorable openings displayed by the African countries. Indeed, subsequently to the ECA Council of Ministers' resolution 280 (XII) of February 1975, which called upon the Executive Secretary of the ECA to establish, as a matter of urgency, a remote sensing programme for Africa and to take practical steps to establish an earth based regional center for receiving and processing data transmitted by remote sensing satellites, an African Remote Sensing Council (ARSC) was formally established with its headquarters in Bamako, Mali (19).

In a "Pre-feasibility Study on Appropriate Modern Telecommunications Technology for Integrated Rural Development in Africa" (20) financed by West Germany and carried out by DATACON and INTELPLAN a new version of a hybrid terrestrial and satellite systems approach was suggested. The study proposed the use of a technology that "must be developed specifically for the African rural environment" and a "specifically designed dedicated satellite system."

Another project carried out in 1981 by European consulting firms (Satel-Conseil, ITM and Bureau Yves Houssein) under the auspices of Eurospace closely monitored radio and television broadcasting in 17 target countries (13 "French speaking" UAPT members and 4 neighboring countries affected by the project). The study, financed by the European Development Fund, the French Aid and Cooperation Fund and the UK Ministry of Industry, concluded that the use of a regional satellite covering the 17 concerned countries may require 400 half-circuits in 1985 and 5,200 in 1994 for the national interurban traffic, and 6,300 half-circuits in 1985 and 49,200 in 1994 for rural traffic. These estimates represent an annual growth rate of 19 percent as compared with the 6.5 percent rate suggested by ITU. The study known as the AFSAT project was ratified in Lome, Togo, in August 1981, by the UAPT Council and was presented as a basis for future studies. In the following years the UAPT, UPAT, and URTNA requested that Eurospace carry out a study on African countries to determine their needs.

Obviously, the dispersion of efforts and the omnipresence of rival consulting firms in the African regional or sub-regional satellite and telecommunications projects did not play in favor of the fifty-four OAU member States ready to venture into the satellite business. The Conference of Ministers of Transportation, Communications and Planning which took place in Addis Ababa in March 1981 recognized in Resolution 17 the necessity for unifying the different studies on communications satellites undertaken by African and international organizations. The Conference also laid out the steps that should guide the integration of these studies for designing a unique multifunctional satellite project (21).

In a desperate effort to unify the wide variety of satellite planning policies adopted by several regional and sub-regional agencies proclaiming their mutual solidarity but nevertheless defending conflicting perspectives, the African countries initiated intense negotiations in 1982. Previous legal dispositions were fertile grounds on which one could rely upon for further efforts to unify positions. On that respect, two legal acts, in particular, were an important step. Resolution 03/T adopted by the Ministerial Counsel meeting held in Dakar in 1980 suggested that "the AFSAT study should be a contribution of the UAPT to the continental satellite project supervised by PATU and the OAU." In 1981, the Lome Council of Ministries of the UAPT members created an AFSAT Coordinating Commmittee (Comite de Coordination et de Suivi AFSAT--CCS) whose task was to follow up on information search activities undertaken by signatories countries and to present to national telecommmunications authorities the technical and economic options foreseeable for orienting their policies (22). The first CCS meeting held in Brazzaville, Congo (7-8 September 1981) adopted the status of the AFSAT Coordinating Committee and prepared recommendations concerning the feasibility of a continental telecommunications satellite system.

At the beginning of 1982 (12-30 January) the Second Conference of the PATU Plenipotentiaries held in Kinshasa discussed at length the AFROSAT project. Since this option was adopted by the Conference of the OAU Heads of State and Government in March 1978 the AFROSAT studies were not really convincing and did not capture the attention of the African governments. This failure can be traced to several factors and, in particular, to political and organizational problems. Politically, most of the African Heads of State did not believe in the immediate feasibility of a continental satellite system and preferred to direct their efforts towards the finalization of sub-regional projects (like the AFSAT system primarily controlled by the former French colonies). Furthermore the Pan-African Telecommunications Union, the only specialized agency of the OAU, was operating under severe budgetary constraints. The Pan-African organization was almost left with empty headquarters and without the basic software facilities.

On 16-18 March 1982, an Inter-Agencies meeting held in Addis Ababa was co-sponsored by the OAU, ECA, ITU, UAPT, PATU and URTNA. The principle of a multifunctional satellite was then reiterated. This signal as the one sent a year before by the Conference of Ministers of Transportation, Communication and Planning (Addis Ababa, March 1981) were directed to the ITU. This meant that the African countries lost confidence in the ability of the ITU to help them implement a satellite system that could properly serve

the telecommunications needs of the continent. Besides, the ITU's pre-feasibility study on rural telecommunications in Africa raised the suspicion of most of the African experts involved in the negotiations at the continental level. The delegate from Mali, for example, who was sitting at the Intelsat Counsel of Signatories as Governor for Group II and who was also Director of Telemali stated that the ITU did not want to work for Africa. He added that the notion of rural telecommunications advocated by the ITU was vague and that the ITU's study on rural telecommunications satellite was likely to be rejected because the African countries could not afford to pay for a satellite primarily designed for rural areas. The Malian expert had also the feeling that the ITU and West Germany (the funding country for the project) tried to influence African telecommunications policies (23).

Such suspicions were not the fact of isolated personalities. In fact, following the June 1982 meeting where the OAU, ITU and ECA agreed on the terms of references of the AMTT/IRD feasibility study being undertaken by the ITU and after the First Meeting of the Inter-Institutions Coordination Committee on Appropriate Telecommunications for the Development of Africa under OAU's initiative (Addis Ababa, 25-27 August 1982), it became clear that many African telecommunications organizations did not agree with ITU's prescriptions.

The ITU pre-feasibility study on the application of modern appropriate telecommunications technology to rural and integrated development was completed in 1982. Conclusions of the study were presented at the Meeting of the Intergovernmental Experts (Addis Ababa, 22-26 March 1982). The objectives of the study were to assess the rural telecommunications needs (including radio and television) and to undertake technical and economic surveys for the implementation of a continental satellite system serving the rural and remote areas and subsidiarily the interurban links inside the countries and the intra-African links between OAU member states (24). The ITU study also insisted on the urgent necessity for carrying out feasibility studies on a country by country basis in order to save time and to avoid the depreciation of the results obtained between the feasibility and the pre-feasibility phases (25).

The First Meeting of the Inter-Institutional Coordinating Committee on Appropriate Telecommunications for the Development of Africa started in a tense atmosphere. In a message read to the assembly, PATU's General Secretary contested the legality of the meeting. This contestation was rejected by the assembly and the ITU study was discussed. The UAPT representatives looked at the study but they said they were not mandated to approve it. They recalled that UAPT's own Coordinating Committee had a study underway with different terms of references and that, besides, the ITU study should be discussed in a meeting between the different interested agencies. In their turn, the URTNA delegates rejected the ITU suggestions on an exchange of radio-television programs by satellite and the implementation of a data transmission network (PADIS-SAT). The reasons given by the URTNA delegates was that the ITU's propositions on radio-television were already included in the UNTACDA's program and that their inclusion in the satellite project was not cost effective and would ultimately be rejected by the African countries (26).

The Second AFSAT CCS Meeting (Dakar, Senegal, 18-19 May 1982) was an important turning point in the organizational undertakings of the African continent with regard to the implementation of a regional satellite system. For the first time, delegates from Ghana, Kenya, Nigeria and Sierra Leone met with their UAPT colleagues. The results of the survey performed by the British firm GTS for the U.K. Department of Industry in Ghana, Kenya, Nigeria and Sierra Leone were presented to the delegates. In the final communique the desire to harmonize the studies undertaken by the "francophone" and "anglophone" countries was once again restated. The parties agreed that the African telecommunications organizations would avoid commissioning similar studies in the same countries. Finally, the participants took note of the intention displayed by the French, British and Italian governments to support the AFSAT projects in a coordinated manner (27).

Translating into facts their will to coordinate their telecommunications undertakings in Africa the French and British did their best to accelerate the pre-feasibility studies under their responsibility in order to completely undermine the efforts deployed by the ITU/West Germany partnership and the growing influence of Intelsat. While the British presented the results of their survey at the Second AFSAT CCS Meeting, the French consulting agency (Satel-Conseil) made available at the Third AFSAT CCS Meeting (Dakar, 5-7 January 1983) the conclusions of a study entitled: "African Telecommunications Satellite: Economic Impact of the Main Parameters in the Useful Load". The study predicted that a high powered satellite is best suited to the African environment. It allows a better use of available frequency resources and it is cost effective with regard to total investments including the cost of the earth and spatial segments (28).

In subsequent years, the AFSAT project was postponed. There was a long list of failures between the 1960s and the 1980s which culminated in the political difficulties experienced by the African States for implementing the Regional African Satellite Communication System (RASCOM). The last meeting held in Abuja under Nigeria's leadership in February 1991 showed once again serious political differences between so-called "francophone" and "anglophone" countries. More than any other country, Nigeria is committed to fullfilling its goals for national unity through the operationalization of a domestic communications satellite system fully integrated into this regional project. Nigeria's territorial size and the magnitude of population pressure on already strained national resources compells her political leaders to find adequate solutions to the country's chaotic internal and external communications links.

2. Africa and the ITU

The ITU organized a meeting in Addis-Ababa, Ethiopia (October 20-November 10, 1972) where the results of a pre-investment survey were discussed. At this meeting, despite the fact that the West African region was not yet fully surveyed, arteries of the Panaftel network were detailed in a design suggesting the linking of about 20,000 kilometers of international transmission routes across the continent and 18 international switching centers. Most of these links were designed as medium-to-high-capacity microwave relay systems.

The ITU also conducted several studies. One of them, called the ITU Plan of Lagos, was carried out in 1971 and was a general plan for the development of the regional network for the period 1970-1978. Traffic forecasts were provided on telephone, telegraph, and telex (29). Another ITU survey of the Panaftel network predicted traffic forecasts covering the period 1975-1990 (30). Some years later, a telecommunications engineer from Kenya, Mr. Phillip Okundi would label these forecasts as inaccurate. He suggested that "the actual traffic requirements were very much underestimated by as much as 50 percent or more (31).

The study carried out by the International Telecommunications Union and approved by the Third African Telecommunications Conference in 1980 (32) suggested the following goals: a telephone density of 1.0 per 100 population and one public call office (PCO) per 10,000 ruralpopulation so that each inhabitant is within five km of an installation.

The ITU study suggested a target supply and demand of 41,260 PCOs by the year 2000 for a rural population totalling 413 million in order to reach a telephone density of 1.0 per 100 persons and one PCO per 10,000 persons "just to meet general requirements," i.e., a supply level well below the demands of self-reliant economies using optimal capacities of integrated telecommunications systems.

The determination of basic service needs for the period 1980-2000 has been postulated around three scenarios representing the rudimentary, normal and optimistic growth patterns. Under the Rudimentary Scenario telephone demand would increase by 72,400 additional telephones in 1980 and by 110,700 additional telephones in 2000 while the PCO form of supply would dominate and special user requirements would be met only selectively. Under the Normal Scenario additional telephones number 243,000 for 1980 and 378,540 in 2000. PCOs would represent only 6 percent of all rural telephones with an annual growth rate averaging 2.16 percent. The Optimistic Scenario targets 243,000 additional telephones in 1980 and 1,072,760 in 2000 with an annual growth rate averaging 7.81 percent.

The total amount of traffic which might be presently generated in Sub-Saharan rural Africa was estimated by the ITU study at around 20,000 Erlangs, an Erlang being a traffic unit indicating the number of all minutes per busy hours. The estimate was based on a rural population totalling 252 million inhabitants theoretically living in 390,000 villages. Village size would vary from 400 to 10,000 inhabitants. It was assumed that the smallest villages (18 percent of the total population) were located within 5 km of other villages. According to projected estimates of the study the additional number of telephones required under the Normal Scenario would total 270,000.

The objectives determined by the ITU study raised many unresolved questions in the validity of ITU's recommendations. First, the presupposed growth trend (6.53 percent per annum) implied a model of economic growth which does not vary with time or which will not be affected by more than eventual social and political changes. Second, the "realistic" target supply of one DEL per 100 inhabitants and one PCO per 10,000 rural population was, in fact, a status quo target which undoubtedly would have placed Africa's telecommunications systems in a difficult position,

especially when one bears in mind the fact that the ITU's target for the year 2000 did not even match the 1979 telephone density in Latin American (3.5 DEL per 100 inhabitants), or in Europe (14.6 DEL per 100 inhabitants), let alone Japan (31.5) and North America (40.2) (33).

The ITU planned period (1990-95) for the launching of a regional satellite (AFROSAT) which would be owned and operated by foreigners indicated that up to the year 2000 the majority of rural populations would be, as stressed by the 1981 ITU report, "without any telecommunications even of poor quality" (34). This final conclusion of the report dispelled the validity of the general recommendations contained in the study. It showed, in any case, the limits of the telecommunications model then foreseen for Africa. That is why ITU's recommendations were rejected by most African countries decided to avoid the dangerous economic and political assumptions ingrained in ITU's report.

The following points can be stressed to explain Africa's rejection of the project:

1. The project failed to reach the proclaimed objective "of significantly increasing the supply of rural telephones" since by the year 2000 the 270,000 additional telephones planned for the hypothetical number of 252 million rural population would correspond to only 1.0 per 1,000 rural poulation (or 0.5 per 500 rural population) as compared to the present average of 1.0 line per 500 inhabitants in the 17 UAPT member countries (35).

2. The smallest villages with an average population of 200 people were ignored in the ITU estimates. The rationale behind such a decision was questionable because such villages numbered 232,000 in the ITU report and represented 46.5 million rural people, i.e., a work force three times numerically bigger than that of France.

3. The then proposed number of additional telephones (1 telephone per village with a population of 400-1,000 people; 3 telephones per villages with 1,000 to 4,000 inhabitants; and 9 telephones per village with 4,000 to 10,000 inhabitants) presupposed a model of economic growth based on the dichotomy between villages and urban centers when the on-going economic model should have been completely reversed if Africa was to avoid being totally recolonized by the year 2000.

4. The assumed average distance of 5 kms between the hypothetical number of 390,000 villages was not realistic, at least, in the Sahel where under the combined effects of national and intra-regional migration and recent ecological changes (drought, rainfall patterns, etc.), distances between villages have considerably increased during this past decade. Consequently, the national and international traffic forecasts made in the study were suspect since they did not take into account the continent's constantly changing ecological and geographical map.

5. The determination of basic service needs reflected in the Normal Scenario was based on the preconceived idea that one PCO per 10,000 rural population and 8 telephones per 10,000 special users (probably including individual users and official units like schools, hospitals, etc.) could have met demand in rural areas. Such estimates had nothing to do with objective

measurements. They corresponded to a subjective assumption superimposed on seemingly objective measures.

This last recommendation could have left Africa with outdated telecommunications systems by the year 2000 when other nations would be industrializing outer space with powerful solar satellites and industrial units processing raw materials extracted from other planets (36).

Moreover, the use of 27,000 PCOs in 1980 and 41,260 PCOs in 2000 meant that even if a dedicated satellite system was used by the Sub-Saharan countries, national telecommunications systems would still heavily rely on hybrid systems dominated by very expensive microwave links. The limits of such hybrid systems have been revealed by the costly ventures observed in Nigeria, Sierra Leone, Kenya, etc.

In addition to these general observations one should refer to the specific critiques suggested by a Washington corporation--Satellite Systems Engineering, Inc.--in a "Review of the ITU Study" prepared for Intelsat in March 1982 (37, 38).

3. Africa and Intelsat

As a result of the lack of coherent telecommunications planning strategies and a poorly coordinated move into the communications satellite business the African countries are facing one of the biggest dilemmas of the post-colonial era. Given the strategic importance of the telecommunications sector in their socio-economic development these countries are now obliged, under the pressing necessity to re-build national networks, to make a drastic choice. They must choose between the uncertainties of domestic systems using Intelsat leased transponders and the prospect of using their own regional communication satellites for domestic and regional purposes.

Raphael Anasiudu detailed statistics showing that most of the African nations communicated via Intelsat more with their former colonial powers than with any other OECD nation. Further, the study suggested that the remaining part of communications taking place followed colonial background (i.e., "francophone" countries communicationg with other French speaking countries, former Portuguese territories clustering with other Portuguese speaking countries in Africa, etc) (40).

I have updated some of Anasiudu's basic findings through a compilation and analysis of Intelsat's System Status Report for the early 1980s (41). Table I below indicates that the African countries used the Intelsat network in accordance with neocolonial ties linking them to dominant capitalist powers. While intra-regional traffic is negligible the volume of international telecommunications traffic (for telephone signals, data transfer and television broadcasting services) illustrates the scale of competition between dominant world powers and lesser powers within the African market place. A few exceptions (South Africa, for instance) are explained by the fact that other channels of communications are used by the Intelsat user country. South Africa is linked to the United Kingdom --the dominant imperialist power in the country-- by a submarine cable. This explains why the United States accounts for most of the outgoing calls through the

Intelsat system. Table II based on Intelsat's traffic data shows how the African countries used the Intelsat network from 1983 to 1987. These countries used roughly only 4,000 circuits for intra-African communications that is 15 percent of the total number of circuits for domestic and international communications.

Using other sources, particularly AT&T figures, one can reach the same conclusions (see Table III).

The major conclusions arising from these facts is that Africans do not communicate between themselves. The bulk of their international telecommunications traffic is directed towards former European colonial powers, the United States and Japan.

The African countries' access to political independence in the early 1960's coincided with two important events in the international political arena: the Cold War was still commanding the march of events and the battle for space conquest reached a new height with the duopoly exercised by the two super powers. In August 1971, the Intelsat Agreement and the Operating Agreement replaced the interim arrangements. According to Pelton, the involvement of giant multinational corporations such as Hughes Aircraft, Philco-Ford (now Ford Aerospace and Communciations Corporation), TRW, Lockheed, General Electric, British Aircraft, Aerospatiale, Thomson CSF, Meyser-schmidt-Bolkow-Blohm (MBB), General Telephone & Electric, ITT, Maconi, Siemens, Nipon Electric, Mitsubishi and many, many others in the satellite and earth stations markets signalled the near disruption of the international market controlled by Intelsat 88). It also meant the proliferation of regional satellite systems controlled by these multinational corporations. For national security reasons member countries of the Organization for Economic Cooperation and Development (OECD) decided to launch their own systems. Japan and the European countries, in particular, successfully designed their own sytems while the construction of the French-German vehicle Ariane largely threatened for the first time the monopoly held by the U.S. National Administration Space Agency in commercial communications satellite business. In the meantime, the Arabs and the Africans were actively planning to develop regional systems while India, perhaps more than any other Third World country, was animated by a powerful will to design and operate her own hybrid communications satellite despite a major presence of Ford Aerospace in its national project.

Given the desperate situation prevailing in their countries, particularly at the level of their terrestrial telecommunications facilities, the African countries decided to "go satellite" hoping to solve immediate and short term problems.

The advantages gained by the African countries in their commitment to Intelsat's institutional and commercial agreements are of two orders:

1) The leased transponder option and the SPADE system available in the Intelsat system are short term alternatives to Africa's urgent need for increasingly growing domestic and international telecommunications traffic.

2) The immediate financial gains offered by the relatively cheap rate of access to the Intelsat network are an advantage that cannot be matched by the use of conventional terrestrial technology.

In the past decade, the number of African countries using Intelsat services has steadily increased. Such a massive participation in the Intelsat system, however, causes serious problems with regard to Africa's national security and long term telecommunications needs.

With an 80 percent increase in 1982 in the number of Intelsat transponders leased for national systems, which accounted for 10 percent of Intelsat's total revenue (40), Africa paid a high price for its communications by satellite. A rented transponder costs around 800,000 dollars per year in 1984. The total amount of money spent by the African countries in the installation of earth stations, for example, is considerable. With a total number of 39 standard A stations valued at 700 million U.S. dollars, and 25 standard B stations at a unit price of 4 million dollars, the African countries disbursed over the past two decades a total sum close to one billion U.S. dollars. If we add to this expenses necessitated by non-standard domestic earth stations (total number: 110), the maintenance and operation costs of the national space and ground segments, etc., the total amount of money spent by the African nations is considerable, especially when compared to the total capital (1 billion U.S. dollars) invested in 1978 by 102 countries in the Intelsat network, including satellites, earth stations and installations (41). The situation is all the more favorable to the launching of an African satellite system given that the recent development of reusable rocket launchers, such as NASA's Columbia Space Shuttle, could lower the launching and installation costs of a regional satellite system by two-thirds (42).

Further, financially, it would be much more profitable for the African countries to pool their capital resources and to spend it in their own regional hybrid system rather than investing in Intelsat's transponder lease services.

Technological self-reliance cannot be achieved by the African countries in the present framework of Intelsat technology transfer policy. In almost three decades of active participation in the multinational satellite organization the African countries have still not been able to take advantage, even on a modest scale, of the technical and training cooperation scheme made available to all Intelsat signatories. Besides, the lack of direct involvement in designing, operating, and maintaining their own satellite system unfortunately delays the necessary acquisition of scientific and practical experience in this strategic field. The benefit of important side effects generated by autochtonous communications satellite activities in the African countries is also delayed. For instance, the development of communications satellite activities is accompanied by steady advances in computer hardware and software given the central role played by computer assisted programs in any satellite venture.

By controlling their own regional system, the African countries can reach a greater flexibility in the use of the satellite system, gaining more effective coverage of their territories and better adaptability to thin route conditions prevailing in large areas of the continent.

It could be advantageous for the African countries opting to receive the services of the geostationary Gorizont satellites at a cheaper rate to join in the Soviet-controlled Intersputnik system. Many African countries (Libya, Angola, Mozambique and Madagascar) tryed to seek membership in the Intersputnik system. Other users like Algeria were not members of Intersputnik but used Gorizont satellites to communicate with Intersputnik member states (43). It seems that up to the Gorbatchev era, the African countries have not used Intersputnik services for political reasons coupled with the fact that the Soviet system was not attractive in its early version with the non-geosynchronous and expensive Molniya 2 series of satellites (44). But the recent collapse of the Soviet empire and the state of chaos prevailing in the now defunct Soviet Union makes it difficult to suggest accurate predictions on this particular respect, at least in the short term.

The African countries will sooner or later be forced to weigh the cost-effectiveness of their participation in the Intelsat system especially with regard to the new conditions created by the proliferation of regional satellite systems, the emergence of Europe in 1992 and the consequences of deregulations of national telecommunications markets in the United States and elsewhere. Many factors will prevail in future African attempts to break the vicious circle of dependency of their telecommunications sector vis a vis external decision centers. Choices in such matters will not be easy. In the late 1980s, for instance, a few African countries were willing to evaluate their choice of the Intersputnik system on the basis of the following factors.

Due to the fact that Soviet Gorizont satellites were more powerful than the Intelsat V satellites, Intersputnik compatible earth terminals could use 12-meter diameter antennas (45). In addition, Intersputnik services were considerably less expensive than Intelsat's. 1984 estimates suggested that the lease of one Intersputnik voice circuit costs 30,000 gold francs (11,615 U.S. dollars) annually while the same capacity acquired from the Intelsat system costs 50,000 gold francs (19,358 U.S. dollars) (46). Finally, Intersputnik expanded its services on a global scale (Statsionar 4 location and Statsionar 5 location are respectively positioned above the Atlantic Ocean and the Indian Ocean) (47). It should be added that with the active experimentation of what is believed to be a prototype of the Soviet space shuttle, the USSR could soon be in a position to significantly challenge the Western world in the race for the control of the international satellite market. A U.S. congressional report suggested that the Soviets are developing a 10- to 20-ton space vehicle that could grow to a "heavy lift reusable shuttle able to carry twice the payload" that the U.S. shuttles Columbia and Challenger have taken into orbit (48).

Another factor that can be seen as a disadvantage to Black Africa's exclusive participation in the Intelsat system lies in the fact that the African countries are waisting their frequency resources either by not using them or by reprehensible complacency. In any case, the danger of exclusion from the global use of the frequency spectrum resources (49) is a real one, as revealed by the successive World Administration Radio Conferences (WARC), especially WARC 1979.

Since the time when the International Telecommunications Union recognized in 1973 that "radio frequencies and the geostationary satellite orbit are limited natural resources" (Art.33 of the Malaga-Torremolinos Convention), the battle for world leadership in communications matters has been largely shaped by the technical, legal, financial and military aspects commanding the control of the geostationary arc and the radio frequency spectrum.

The Minister of Information of the Sudan portrayed this conflicting situation very well when he said that the developed countries have 90 percent of the spectrum and 10 percent of the population while the Third World countries have 90 percent of the population and 10 percent of the spectrum (50).

The use of the orbit-spectrum resource should be very high on the telecommunications policy agenda of the African countries. The longer these countries wait before either directly using or protecting their share of the geostationary arc the more likely they will have to negotiate the use of this resource under very unfavorable conditions.

This situation is aggravated by Africa's absence of involvement in an autonomous regional satellite system and the weakness of her participation in the ITU frequency allocations for satellite communications. The geostationary orbit will soon reach a state of near saturation given the proliferation of domestic, regional and military communications satellites in an arc already showing signs of saturation and/or misutilization of the orbital slot locations (51). The 4/6 GHz location already shows that saturation of the orbital arc is near capacity while the 11-12/14 GHz band indicates a state of advanced saturation when the projected use of the geostationary allotments will be effective. Current forecasts show the acceleration of the trend towards saturation of the geostationary arc in the C-Band and the K-Band. This does not leave any doubt as to the present and future overcrowded aspect of the geostationary orbit although recent technological adavances do suggest that the advent of giant platforms and new possibilities offered by multifunctional interfacing between several satellite systems will preempt current concerns on the overcrowding of the geostationary orbit.
Even if this scenario became entirely plausible, the African continent could be left with no more than two orbital parking lots planned to be used by Nigeria and two other allotments reserved by the Arab countries including the Northern African countries all particpating in the Arabsat system. Thus, with an estimated population of 600 million people, one of the largest emerged landscapes and the richest reservoir of natural resources in the world, Black Africa will have at best at her disposal in the 1990s three orbital slot locations (two locations for the more than hypothetical launching of the Nigerian National Satellite 1 and 2 series and possibly another orbital location for the planned RASCOM system which is already weakened by conflicting African policies) on a theoretial total number of 1,800 orbital 'parking spaces (52). According to the U.S. based Satellite Communications magazine, the number of commercial, experimental, meteorological and military satellites may have reached by 1990 a grand total of 1,186 vehicles, that is to say, nearly 66 percent of the available geostationary resource (53). By the end of the century, therefore, the Black African countries' share of the geostationary arc may represent only 0.3 percent of this resource !

The Western capitalist world basically perceives its spatial and communications satellite undertakings as a replica of the strategies of telecommunications penetration enforced during the mercantilist and the monopolist periods when terrestrial telegraph and telephone networks and submarine cable lines were used as technological tools meant to powerfully back European military, commercial and political interests in colonized countries. Intelsat was conceived in this line of thinking. It used to be a safe financial venture, particularly at a time when the dominated countries did not have the technological means and did not meet the political conditions for self-reliance in the communications satellite business. From an economic standpoint the Intelsat formula was a powerful incentive to strengthen the commercial activities between the Western world and the dominated countries.

A colonial pact regulates relationships between Africa and the capitalist world. While the French are doing their best to strengthen their political and commercial ties with their former African colonies, the English and Americans are trying to have a say in Nigeria's attempt to launch a dedicated satellite. However, within the European Space Agency the French and English and their West European partners are willing to jointly control the design, operation and maintenance of the planned launching of RASCOM, a regional satellite system conceived as the technological backbone of a European-African entity.

After missing the Canadian opportunity, the Europeans are extremely anxious to keep under control their African preserves (54). In this regard, the competition between the U.S. Space Shuttle and the French launcher Ariane takes primary importance. The United States, and particularly COMSAT --Intelsat's godfather-- does not favor the existence of a regional system in Africa because it could well mean Intelsat's collapse and a hard time for the U.S. telecommunications industry.

The Reagan administration's move towards the opening of the international satellite communications market to U.S. private telecommunications firms has generated serious contradictions between Intelsat and corporate America (55). The conflict has been crystallized around the merciless struggle between Orion Satellite Corporation and Intelsat (56). In a study prepared for Orion by Dale N. Hatfield Associates of Boulder, Colorado, Orion refuted Intelsat officials' argument that the consortium's averaged rate structure operated as a subsidy to Third World members and that this would be destroyed by approval of Orion's proposal to build and operate its own trans-Atlantic satellite system.

Before the accusation that Intelsat is not subsidizing rates for its poorer members as it claims and that the subsidy may be
flowing from Third World countries to the capitalist world, the Comsat and Intelsat officials have argued that:

1) Intelsat planning hinges on the concept of a single global system. Over two and a quarter billion dollars is being invested in future systems, and the viability of this investment...rests to a large extent on the transatlantic traffic. Fragmenting that market would entail serious financial consequences for Intelsat members and non-member users alike in the form of presumably hefty rate hikes (57).

2) U.S. approval of the private satellite corporations applications to build satellite systems for the North Atlantic would surely damage U.S. international and foreign relations interests with the Soviet Union gaining from the development due to its Louch series of eight satellites intended to provide services comparable if not superior to Intelsat (58).

3) From a financial and economic standpoint it would be a disaster for the interests of the United States government and its telecommunications industry to open the international satellite market to private competition.

Indeed, before the U.S. Senate Foreign Relations Committee, COMSAT President Joseph V. Charyk pointed out that the United States greatly benefited from Intelsat's growth. Since 1964, about 939 million U.S. dollars have been spent or allocated for satellite construction and more than 83 percent of that (778 million dollars) has gone to U.S. manufacturers (59).

In addition, NASA has been paid some 700 million dollars to launch these satellites. COMSAT's President added that the United States contributed about one-fourth the capital costs of Intelsat, yet received over 75 percent of the contracts it then awarded. These contracts significantly contributed in placing the United States aerospace industry in a worldwide leadership position. Further, Charyk said, "there is no question that our involvement in the Intelsat system has benefited the United States significantly in our balance of trade" (60).

This testimony shows how important Intelsat is to U.S. commercial and strategic interests. It also shows the considerable profits made on the back of Third World countries and particularly the African countries located in the Atlantic region.

In return, the benefits gained by the African countries in the Intelsat venture are rather meagre. The Intelsat Governor for Africa (Group II) and also former Chairman of the Malian Telecommunications Office in the early 1980s, suggested that Intelsat is not equipped to cover Africa's domestic communications needs. He further contended that from a national security standpoint the situation could have damaging consequences for the African countries unable to cope with increasing telecommunications needs which are crucial militarily, economically and from an administrative standpoint. The African representative also questionned what he called the "shameful axes" referring to the telecommunications axes between Paris or London and the major African capital cities (61). Pushing this reasoning to its logical conclusion, an Ethiopian expert and Intelsat staff member raised the following question: "If we cannot design our own spacecraft, communications satellites, etc., are we really independent" (62) ?

The question is all the more pertinent that before international appetites the African countries are virtually defenseless and do not have much choice between the "global domestic satellite system"(Glodom) concept suggested by the ITU and the "global village" formula advocated by Intelsat.

The ITU position is that "Glodom would use dedicated transponders or satellites to provide thin-route telephony and other services to rural areas of developing countries". The ITU further contends that Glodom would satisfy a need not only currently addressed "since at this time Intelsat

isn't effective or economical for many domestic service networks required in some Third World countries." This means that the low Intelsat edge EIRP requires large antennas raising earth station costs up to 2 million U.S. dollars each in 1984 (63).

The central objective of Intelsat is "to design, build and operate a system of geosynchronous satellites and supporting ground facilities that supplies public telephony, data, and television service to its 109 member nations". The Intelsat Agreement has established a policy of providing domestic space segment requirements under one of three possible allotment agreements: as a five-year lease for a full 36 MHz transponder, as a one-year, non-preemptible leased service, renewable each year, and on a circuit-by-circuit basis(64). Before the threats of regional communication satellite proliferation and the controversial aspect of the famous Article XIV in the Intelsat Agreement (65), the Intelsat authorities are anxious about the future of the organization.

Almost immediately after being elected Director General of Intelsat, Richard R. Colino warned the international arena that "it should not come as a surprise that Intelsat is concerned that it might have to raise rates and suffer revenue shortfalls if other systems are permitted to serve the heavy traffic streams, such as the North Atlantic". The prospect for higher tariff rates in Intelsat delivery services could well mean that in the 1990's the African countries would not be in a position to meet their growing telecommunications needs, especially if the African countries are not able to launch their own regional communications satellite system by the end of the millenium.

A final point may be raised in the review of the disadvantages associated with Intelsat monopoly on the communications satellite traffic needs of the African countries. It relates to Africa's national security demands and the extent to which they are met in the framework of the Intelsat system, especially in the face of attempts by the Pretoria regime in a recent past to monitor or even block telephone calls from Burundi whose communications signals were routed via earth stations located in the country of apartheid.

It has also been suggested that the U.S. National Security Agency has placed receiving antennas in virtually all the "hot points" where the international calls routed in the United States through the Intelsat earth stations are received. In this manner, the NSA monitors all the outgoing and incoming communications signals presenting a definite significance for U.S. "national interest", a notion including spying activities from an economic, military and political standpoint (66).

Where does Africa stand in the battle for world leadership through the control of scientific research in commmunications matters ? One would hardly find elements of answers to these questions in the ongoing African telecommunications policies. It would be a serious mistake to separate discussions on national security from any present or future telecommunications venture in the African continent. Africa's massive participation in the Intelsat system must, therefore , be evaluated with regard to the protection of the African countries' national security interests.

This all too often forgotten truth appeared clearly in the 1970's when Nigeria, with the support of Libya, firmly envisaged to require a West African satellite for use with its domestic earth terminals and for lease of satellite transponders to other West African countries. The project fell short, however, because Nigeria was faced with the consequences of oil recession on its cash reserves and also because the international banking community was reluctant to finance a venture that would have been a threat to the interests of Intelsat and the multinational corporations controlling the African telecommunications market.
The confusion presently surrounding Africa's venture in the satellite business is aggravated by the fact that until very recently the AFROSAT and AFSAT projects were a political dividing line between "francophone" and "anglophone" African countries despite official proclamations on African unity.

It is unlikely, according to the best estimates that the RASCOM system will be operational before the year 2000 at the earliest. By 1985 the African countries had already leased a total of at least 36 transponders which represented the largest part of leased capacities in the Intelsat system. The implication of such a developement was a new stage towards Intelsat's increasing influence on African telecommunications systems and policies.

The European nations have already come to the conclusion that their full participation in the Intelsat system is harmful to their economic development and national security requirements. Consequently, they are actively programming, or have already completed launching of their own regional and domestic communications satellite systems. Through the RASCOM project, the African countries are somewhat ingraining their action in the international trend commanding the evolution of satellite communications ownership and control.

4. PANAFTEL: A Poisonned Heritage

Total investments required to finance the proposed Panaftel network, which would entail the establishment of 20 international switching centres and 33 international telex switching centers supported by around 30,000 kms transmission routes consisting of high frequency, microwaves and coaxial cable systems was estimated at a cost of 100 million U.S. dollars (1972). More recent figures suggest that the cost of such a network would cost at least twice as much as the initial estimate. If one includes the project of the 5,000 kms submarine cables linking Casablanca to Dakar, Abidjan and Lagos, and the investments required by the 38 Intelsat earth stations equipped with A or B size antennas as of 1982, as well as a growing number of African countries planning to lease Intelsat transponders for domestic use, the cost of an integrated telecommunications network could cost to the African countries several billion dollars at the turn of the century.

For the time being, the project is progressing slower than predicted, in the face of the reluctance of bilateral lending institutions to finance ventures with a supposedly low internal rate of return and the handicap represented by the fact that the countries negotiate separately the construction of Panaftel's different sections.

By the end of 1981, it was expected that the Panaftel network would have 40,000 kms of microwave systems in operation which would have corresponded to an increase of more than 12 percent in a decade (67). In order to evaluate the meaning of these figures one must refer to the historical circumstances under which the Panaftel network was created, and more specifically to the terms of the negotiations which took place between the African countries and the other interested parties.

Before the unwillingness of the world's major lending sources to finance the construction of the Panaftel network on a multilateral basis and under reasonable financial terms, the African countries accepted to negotiate the Panaftel project on the basis of bilateral agreements. This implied costly risks of conflicting decisions in the design of the network and the promotion of intra-African communications on a sub-regional scale.

Besides, the division of Africa into zones of influences persisted with the project while regions already well provided with telecommunications services received all the benefits to the detriment of the more disabled countries and areas (68).

Another major shortcoming of the Panaftel project was the absence of serious concern for the incompatibility of new techniques with existing systems (69) and the absence of manufacturing capabilities even for some types of peripheral equipment and some basic plant like poles, cable ducts, insulators, etc. The impossibility to build from a locally generated technology internal and external structures (towers, air conditioning ducts, earthing accessories, etc.), cables (open wire, underground cables, power cables, open and insulated) and several other engineering tools needed in telecommunications installation and maintenance, or essential equipments like switching devices, were as many sources of weakness and confusion (70). But such requirements did not receive much attention during the implementation phase of the Panaftel network. Instead, very unrealistic targets were set for the network during the United Nations Communication Decade in Africa (71).

A major issue of concern in the Panaftel project and the Transport and Telecommunications Decade was the improvement, or more exactly the creation of a rural network in Africa. A report analyzing the Decade of Transportation and communications in Africa has suggested that telephone has made a negligible impact on areas with a low population (72). The report pointed out the fact that "over 300 million people, or 80 percent of the population, live in rural areas, but the network has been concentrated in major cities and towns."

Consequently, one of the main objectives of the African countries is the extension of public telecommunications service to the rural areas as well as urban centers. The International Telecommunications Union has proposed the provision of one public call box for every 10,000 people in the rural areas if the telecommunications sector can expand at a rate of 14 percent per year for Black African countries. Despite the modesty of such a projection, the probability of a significant expansion of African telecommunications is low (the projected rate is around 10.4 percent for the whole of Africa according to the United Nations Economic Commission for Africa).

Before these uncertainties a question remains unanswered: if national economies are not improved, how will it be possible to build a Pan-African network in the rural areas and where will one find the required funds? If these funds are provided by external sources, will the goal of 1 public telephone box for 10,000 people significantly improve the telecommunications demand in the rural areas, and in this case, will it be realistic to expect an expansion of telecommunications demand in the same areas?

One may add that the PANAFTEL project as it is presently known leaves very large areas in Northern Mauritania, Mali, Niger, Chad, the Central and Southern Sudan, the Central African Basin, Central and Northern Zaire, the entire Far Eastern part of the Horn of Africa without any basic terrestrial telecommunications facilities. Furthermore, the project ratifies the de facto partition of the continent into two areas: the Maghrebin countries (plus Egypt, the western Sahara, the Sudan and possibly Libya) more inclined toward the ARABSAT project, and the so-called Sub-Saharan Africa where the PANAFTEL system operates.

Finally, one can be assured that if all the hypothetical funds to implement the project were ever received, the debt incurred by the African countries would not have been repaid beyond the year 2020. The PANAFTEL project may seriously aggravate the external debt of Africa and, consequently, block the investment capacities of these countries in other vital sectors.

It is difficult, after having identified the facts commanding Panaftel's evolution, to be enthusiastic about the future of the network. Beyond the constraints listed above, there are many fundamental questions determining the lives of millions of Africans and the future of several generations to come which are not addressed by the Panaftel project as it is presently conceived. These questions are the following ones:

* Who will provide the hundreds of million dollars needed to complete the project and where will the resources come from?

It is clear that the already huge external debt of the African countries, the blocked character of their economies and, before all, the state of extreme material and moral poverty in which evolves the overwhelming majority of the African peoples do not plead in favor of an economic recovery in a visible future. The African telecommunications authorities know it and the African governments are aware better than anybody else of the economic abyss into which the continent is plunged. But senseless hopes and carelessly conducted telecommunications policies fed by external pressures coming both from multinational corporations, financial lending centers of the capitalist world and from the dominant spheres of the African societies have led to the belief that the widely practised neocolonial policies and the outward-oriented looking communications networks of the African countries could give birth to a significant development of telecommunications systems and national economies. While this golden dream is literally falling apart before our eyes, capital hunting in the international lending circles is still in practice and is even perceived as a panacea by planning authorities more anxious to fulfill a mythical vision --the construction at all costs of a Pan-African network emptied from any meaningful dimension-- than to courageously weigh the

unfavorable terms and certainly the devastating effects of a network that would not meet the needs of the rural masses. Such a network would not indeed be of much utility in improving low illiteracy rates, pressing long distance telephone needs and television demand in countries where this medium could be of a tremendous help in the educational, political, social and cultural spheres.

The supreme failure for the African rural world would be to finance the Panaftel network without the farmers, fishers and herders being able to benefit from increased telecommunications services (more PCOs per locality, less expensive telephone and telegraph rates, increased level of intra-rural telecommunications, fast delivery of meteorological data to improve agricultural practices, health delivery units backed by an efficient telecommunications system, etc., etc.). The present state of impoverishment of the rural masses and the aggravating disparities between the rural areas and the cities may not allow the African rural world to be in a position to accept the considerable efforts required by Panaftel's completion.

Consequently, the only available source of financing remains the traditional channels provided by the World Bank, the European Economic Community, private businesses, the multinational corporations and countries interested in telecommunications investments in Africa. But as we all know, the economic recession prevailing in the capitalist world coupled with recent turmoils in international relations will not make possible the advent of spectacular investments in the African telecommunications market. Then, to know where the money will come from to finance the Panaftel project will truly remain a jigsaw puzzle as long as one locks oneself in the false dialectics of the unrestrained recourse to foreign "help."

* In what ways should the Panaftel project contribute to the economic development of the region?

It is difficult from now to speculate on Panaftel's future impact on the African economies in the XXIst century. However, a certitude remains: if the network's present conceptual framework is maintained, at the beginning of the next century the African telecommunications network would not have any function but to link capital cities built a la Bresilienne or at the image of Abidjan and Nairobi while the rural areas would suffer from isolation and extremely poor telecommunications services.

But more importantly, we would have failed to build a network in conformity with the objectives of economic self-reliance because the Pan-African telecommunications network would be the extension of the old colonial routes confined in the coastal areas and the "useful" agricultural and mining areas. Moreover, the Panaftel network would be nothing but a kind of a Trojan Horse whose function would be to link the African networks to the "Wired World" or the "Global Village". Such links would assure to world capitalism the control of Africa's military space and the accelerated pillage of the local raw materials and agricultural products.

* What do we need the Panaftel network for?

Depending on which side of the telecommunications spectrum one is speaking from and who takes position on the issue several options are available.

From the users standpoint the network should speed up the level of communications within the rural world. The Senegalese farmers may need to know more about the agricultural conditions of the Pongwe people in Gabon and vice versa. The Niominka fishermen living in the Salum Islands may be anxious to have a better knowledge about the fishing traditions, the level of production and the price markets in the Madagascar Islands. The Erythrean shoemaker would be surely happy to use the network in order to be approvisioned with good quality skins at competitive prices by one of his Yoruba colleagues in Nigeria. Instead of walking or at best riding a donkey to reach in emergency the closest medical center located several dozen miles away the African woman living the Sahelian area would surely appreciate being able to quickly reach a doctor either by telephone or through a radio link. These down-to-earth preoccupations are those of the majority of the potential users living in the rural areas.

Consequently, the cornerstone of any planning strategy aiming at launching the Panaftel project should be the satisfaction of the basic telecommunications needs of the African masses. The ultimate objective of such a project should be to alleviate the sufferings of all orders suffocating the African rural world by increasing the level and speed of communications, the level of productive forces and contributing in the transformation of the global mode of production.

In order to reach such goals, the telecommunications planning efforts of the next decade should not be concentrated on the rural areas alone. The African countries cannot afford to operate a satellite system for the rural world alone for all the reasons raised earlier. A hybrid satellite system doubled with microwave, high frequency and submarine cable systems should certainly be more appropriate to the African conditions. But microwave systems should not be implemented in different arteries just because external pressures would have imposed their presence in the network. Microwave systems are expensive and they must preferably be launched in areas where a high level of traffic density would allow their competitive existence.

* Who will operate the Panaftel system ?

One of the important externalities that one is rightfully inclined to expect from the Panaftel system is the qualitative and quantitative improvement of the personnel operating the network. The tragic lack of qualified manpower, particularly highly trained engineers, pleads in favor of a more aggressive and skillful planning of professional education in telecommunications studies. The rare workshops animated by the ITU for the training of mid-level engineers cannot solve this delicate problem nor can the educational programs intended to give a practical training to African students attending the few telecommunications schools existing in the continent. It is indeed urgent that the narrow minded approaches confining technical studies to the management and operation of the existing high frequency circuits dominating the network be re-oriented in response

to the pressing necessity for re-designing the content and purpose of applied research and professional training in the African telecommunications schools.

There is no royal way to reach technological and economic wealth but to be off the beaten track and to be committed to knowledge acquisition and apprenticeship. Apprenticeship is ultimately linked with the pitfalls of learning during probationary times. But errors educate for life. They impress on collective memory the indispensable character of technological innovation and the imperatives of nation building. The untimely recourse to Western "assistance" for repairing the slightest breakdown in national networks or manufacturing an electrical wire or a switching system castrates peoples' confidence in their intrinsic capacities. The perpetuation of this situation makes them vulnerable to foreign invasion and control.

The safest way to avoid technological underdevelopment is to do for oneself what others have done for themselves: to learn from one's mistakes, to avoid being inhibited by small details or daily preoccupations and to project oneself towards the remotest future. For it is wiser to master the future today than to wait until tomorrow when it will be too late to understand its complexity.

5. Prospective Avenues for Telecommunications Liberation in Africa

The question emerging from the facts discussed here is whether Africa has better chances today to win a significant place in nations' march towards socio-technical progress.

The answer is yes if she is able to develop in a single Pan-African audacious and yet realistic self-sustainable and self-reliant communications systems before the beginning of the next millenium. There must be no other way to envision the future, especially when one bears in mind the fact that if present economic policies were pursued it would take close to one century to the 20 poorer countries of Africa to double their present per capita income.

Africa's involvement in the telecommunications industry is quite marginal. Most of the countries are still unable to manufacture simple cables, microwave technology, microprocessors, switching devices, satellite dishes, fiber optics systems, etc. In addition, there are severe training problems associated with a lack of coordination of policies and prospective needs.

All of this is happening at a time when predictions on communications advances are being challenged by the imminent industrialization of the outerspace, the operationalization of megaton satellites, fiber optics networks carrying at light speed thousands of signals at the same time, etc. Man has landed on the moon and is trying now to exploit its mineral resources. Mankind is faced with a new need. Advances in astronomy and spatial communications have forced us to correctly pose and solve the equation of our relationship with the numerous galaxies of a universe in full expansion.

It is time that by pooling their resources, the African countries create a Pan-African Centre for Spatial Studies backed by African university resources and know how. Such a centre would have as a main target to make possible the mastering of satellite communications technology and developing new technologies for optimal utilization of the most needed frequency bands.

In accordance with this objective, the African countries should immediately launch actions at the appropriate levels of the International Telecommunications Union and the United Nations system in order to get space slots in the geostationary orbit and allocations in the frequency spectrum resources matching the legitimate spatial ambitions of a respected Africa.

It is not unreasonable to think that with all her tremendous potential in natural resources, and with the decisive and radical changes that could be generated by a united Africa within an economic federation or a United States of Africa, the continent could in a relatively short period, successfully develop a truly modern telecommunications system in the vanguard of technological achievements.

Three conditions will determine the success of such goals :

1) the unification of the continent and its economic integration at the Pan-African level;

2) the achievement of economic and technological self-reliance ; and,

3) telecommunications strategies primarily based on the total development of rural areas through the decentralization of the economic life from the present cities to the rural areas.

These objectives are attainable if we keep faith in the necessity to unite Africa. Those submitting that without foreign help Africa cannot be developed forget to evaluate the geostrategic and economic weight of this continent. One should bear in mind that Africa is three times larger than Europe or the United States. It covers 30 million square kilometres and accounts for between one-quarter and one-third of the world's land surface. In 1980, the population was around 470 million, i.e., one fifth of the world population. It should reach 813 million by the year 2000. Despite drought, desert creep, threatened plant species, and endemic human and animal diseases, the continent is known to possess considerable agricultural, mineral, energy, forest, fish and wildlife resources.

A colonial explorer wrote a century ago that Africa was a "geological scandal". Africa's share in the world's mining sector (excluding the Soviet Union) is indeed impressive : 99 % of industrial diamonds ; 86 % of palm kernels ; 82 % of cobalt ; 81 % of gold ; 72 % of cocoa ; 62 % of chromite ; 49 % of manganese ; 30 % of phospate rock and copper, etc... (20). Nigeria was until recently the world's fifth largest oil exporter. It produces 85 % of the world's niobium depositis. Ghana is the world's second largest manganese producer.

There is some danger in subjectively assuming in the analysis of African telecommunications needs the ideological presupposition that Africa is naturally poor and that the living conditions of the African masses cannot be improved. This view is part and parcel of the colonial and neo-colonial strategies developed by the European and North American countries.

Telecommunications strategies developed without regard to regionally and continentally integrated economies and the subsequent growth, in real terms, of the African telecommunications market, is doomed to bankruptcy.

The all too often forgotten demands required from a nation seeking to reach a level of technological self-reliance in telecommunications matters must be restated here.

A nation whose communications flow is conditioned by trading patterns with a former colonial power is not a free nation.

A nation seeking to build a technological base through the language of a former colonial power is not a free nation.

A nation unable to manufacture its own communications technologies is not a free nation.

Therefore, the immediate goal of such a nation is to destroy the bundle of unfavorable factors making it a dependent nation.

The conclusions to draw from this overview of African telecommunications history are manifold :

* the economic development of the continent is inconceivable without considerable financial investments in the telecommunications sector ;

* the present model of development based on the pre-eminence of the urban centers over rural areas must be completely reversed if an integrated Pan-African telecommunications system is ever to be built ;

* it is unrealistic to expect the emergence of self-centered and balanced economic systems from a rural telecommunications sector based on the current dichotomies plaguing national economies (capitals vs. secondary cities vs. villages, or agricultural vs. import substitution) ;

* taken individually, none of the African countries can develop their telecommunications systems at the required level. Consequently, the only way to transcend the present constraints is to build an integrated Pan-African telecommunications network with priority given to a balanced and vigorous development of rural areas where live the overwhelming majority of the proletarianized African masses ;

* the financial constraints would no longer be a problem if the continent itself exploited its natural resources from an Afrocentric perspective ;

* the required trained manpower to operate and design the telecommunications systems could be available if a Pan-African School of

Telecommunications, taking into account the sub-regional constraints and the situation particular to each area, is created ;

* the lease of transponder capacities in international commercial satellites organizations is a temporary solution and could aggravate in the long run Africa's technological dependency ;

* the only reasonable way to overcome such a technological constraint is to envisage the construction of a spacecraft designed, operated and owned by Africans. Judicious South-South cooperation coupled with balanced North-South technical cooperation and an accelerated trend of scientific education can realistically help Africa build its own satellite system before the year 2010 ;

* the use of such a continental satellite system would not, however, solve all the problems. The success of the African telecommunications network will finally depend on the level of efficiency of the terrestrial network coupled with the continent's economic integration and self-reliant development.

The sufficient condition for the existence of an African satellite system is the willingness of the African countries to open their telecommunications markets to an unprecedented level of foreign capital expansion and to place themselves in a position of total dependence vis-a-vis external decision centers to operate, maintain and expand the system.

But the necessary condition for Africa's self-reliance and economic development through the utilization of a regional satellite system is twofold. First, major parts of the domestic communications satellite in question must be manufactured in Africa thus, enabling the Africans to build their own satellite system from a science and technology policy rooted in the African cultural genius. Second, success in this area depends on the fundamental necessity to promote economic self-reliance, political liberation and cultural development on the basis of African unity. Such a unity would be based on the unity of African peoples and certainly not on a social alliance of African and international bourgeoisies.

What should be done to meet according to the best terms the conditions for the emergence of a self-reliant telecommunications system in Africa? Relying exclusively on foreign help has proven in practice that it can only lead to bankruptcy. It should be excluded from any serious attempt to rebuild the African telecommunications systems.
Another way to negotiate advantageously in the framework of the present international telecommunications order, would be: 1) to let one single Pan-African organization negotiate all the agreements, the equipment contracts and the design of the future RASCOM system; 2) to change the present unfavorable technological position of the African countries by promoting a South-South cooperation enabling them to exchange telecommunications hardware and software; 3) to promote a vigorous effort for the training of high level engineers through the creation of a Pan-African school of telecommunications dealing with the operational, maintenance, design and planning aspects of new communications technologies.

The question emerging from the facts discussed here is whether Africa has better chances today to win a significant place in nations' march towards socio-technical progress.

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To the extent that any Party... intends individually or jointly to establish, acquire or utilize espace sgment facilities separate from the Intelsat space segment facilities to meet its international public telecommunications service requirements, each party... shall consult with the Assembly of parties... to avoid significant economic harm to the global system of Intelsat.

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